Instructions for Electronic Forms

2012 Washington State Energy Code Compliance Forms for Commercial, Group R1, and > 3 story R2 and R3

Revised June 2013

Intro	Commercial Provision Chapters 1 - 4 of the 2012 Washington State Energy Code apply to all commercial occupancies, R-2 and R-3 occupanies greater than 3 stories above grade, and R-1 occupancy (all building heights). This file, MECH12.v1.XLS, has electronic compliance forms for mechanical provisions as defined in Sections C101 and C403. There are three companion files: ENV12-v1.XLS (Section C402 envelope requirements), LTG12-v1.XLS (Section C405 lighting systems requirements) and MTR12-v1.XLS (Section C409 metering requirements).
Energy Code	This form is a compliance aid and is not a substitute for the full energy code text or specific jursidiction compliance requirements. Users should refer to the code text and contact the local jurisdiction for complete information. The full 2012 WSEC code text is available for download from:
Commercial Provisions	https://fortress.wa.gov/ga/apps/SBCC/File.ashx?cid=2670
Appendix A	https://fortress.wa.gov/ga/apps/SBCC/File.ashx?cid=2672
Start-up	Open a working copy of this file and be sure to use Save As to save it to a new file name and enable macros. Alternatively, you can save the file as a template in the XLSTART subdirectory in the EXCEL directory, and open new copies with the "File New" menu command. Look for "MECH12-v1".
Overview	This workbook file contains multiple worksheets. Each worksheet is indicated by a tab at the bottom of the screen. You may visit each form by clicking on its tab. Most calculations are automated. The spaces which display the results of calculations are write-protected and cannot be edited.
Save Files	Each time you open this file and input information into the forms, you must save it under a new filename of your choosing using File Save As. The original template file cannot be altered. You may also save your own versions of the forms this way.
Getting Around	Some forms have two pages (front and back). Both pages are available on screen when you click the tab for a form. Use the scroll bars to find the second page. It is either to the right, below, or sometimes to the right and below the first page.
Filling Fields	All general project information and the date are entered once on "MECH-SUM." This information is automatically replicated on all other MECH forms. The MECH-SUM form accompanies all other MECH forms. Only fillable fields are accessible. If you try to edit any other field, you'll get an error message. You may use the TAB key to move to the next fillable field. If the TAB doesn't take you where you want to go, use the mouse. A password is not required to complete these forms. Avoid excessively long text strings when entering information. In some cases, text that extends beyond the available space will simply not be seen. In most cases, the text will wrap within the cell. This may force part of the form onto a new page To enter the date, use this format: mm/dd/yyyy. For example, you would enter 7/1/2013 or 12/21/2014. Check boxes can be checked or unchecked by clicking in the box with your mouse. Radio buttons (circles) allow only one in a set to be selected. Drop-down lists have an arrow at the right side of the space. Click the arrow with your mouse and select the appropriate option. One of the options is a blank. When a form has a space for notes or explanation, click anywhere in the space to edit.
Personal-izing	You can personalize the forms with your company name, address, phone, or any other information. This is done by editing the footer in Excel. You can then save the file under a new template name and re-use it again.
Adding Lines and Removing	Many tables, such as for listing mechanical equipment types, have a certain number of lines for entering data. There may not always be enough lines for all the entries you need to make. Where this feature is available, you can add additional lines to the table by selecting the "+" button on the right had side of the table with your mouse. If you can't see it, scroll right (or change the View Zoom setting). To remove lines that you have added, click on the "-" button with your mouse. You cannot remove lines that were not added; an error appears if you try. If you add additional lines with this method, the pagination will usually be affected. The forms will be forced to carry additional lines over to other pages. Be sure to submit all pages to the plans examiner.
Printing	The forms should print on any printer supported by Windows. You will need to have the following TrueType fonts installed under Windows: Arial, Times New Roman, Courier New and Wingdings. These are all standard Windows fonts. If you are losing form or flowchart details when printing, you may have a shortage of printer memory. Try printing problem pages individually. By default, only selected forms are printed. To select one or more forms, hold down the Ctrl key and click the tabs of the worksheets you need. Issue the File Print Selected Sheets command. To print the entire set, use File Print Entire Workbook.

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Clean Forms	It is possible to print clean, blank versions of these forms for hand filling. To do so, delete all of the heading information at the beginning of MECH-SUM. Make sure that all fillable cells in the forms are empty. Then print the clean forms. For each radio button group, there is a button labeled "Clear." Clicking this button will clear the other buttons so that they will print as empty circles. The "Clear" button will not print.
Partial Form Sets	Forms in a set may not be deleted, because the file is locked, but you need not print all the forms, as explained in "Printing" above.

Mechanical Summary MECH-SUM

2012 Washington State Energy Code Compliance Forms for Commercial, Group R1, and > 3 story R2 and R3
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Project Info	Project Address	Date
		For Building Dept. Use
	Applicant Name:	
	Applicant Address:	
	Applicant Phone:	

Project Description	
Briefly describe mechanical system type and features. ☐ Includes Plans	Include documentation requiring compliance with commissioning provisions per Section C408.

Compliance Option	◯ Simple System ◯ Complex System ◯ Systems Analysis

Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.

Cooling Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	OSA CFM or Econo?	SEER or EER	IPLV[3]	Econmizer Option or Exception[6]	Heat Recovery Y/N

Heating Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency[4]	Heat Recovery Y/N

Fan Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	CFM	SP[1]	HP/BHP	Flow Control[5]	Location of Service

Service Water Heating Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Input Capacity	Sub-Category	EF[7]	Location of Service

[1] If available. [2] As tested according to Table C403.2.3(1)A thru C403.2.3(8). [3] If required. [4] COP, HSPF, Combustion Efficiency, or AFUE, as applicable. [5] Flow control types: variable air volume (VAV), constant volume (CV), or variable speed (VS). [6] Economizer exception number per

Mechanical Permit Plans Checklist - Page 1 of 3 MECH-CHK

2012 Washington State Energy Code Compliance Forms for Commercial, Group R1, and > 3 story R2 and R3 Revised June 2013

Project Address					Date
The following information is necessary to check a mechanical permit application for commercial provision compliance with the 2012 WSEC. **NOTE: Define print area in Excel prior to printing MECH-CHK pages.**					
Applicability (yes,no,na)	Code Section	Code Provision	Information Required	Location on Plans	Building Department Notes
GENERAL PROVISIONS					
Equipment Sizing & Performance					
	C403.2.1	Load calculations	Load calculations performed per ASHRAE Std 183 or equivalent per Chapter 3		
	C403.2.2	Equipment and system sizing	Output capacity of heating and cooling equipment and systems do not exceed calculated loads, note exceptions taken		
	C403.2.5	Minimum ventilation	Ventilation (natural or mechanical) provided per IMC; indicate mechanical ventilation is capable of being reduced to minimum requirement per IMC		
	C403.2.3 & C403.2.3.2 & C403.2.12.1	Equipment minimum efficiency	Provide equipment schedules or complete MECH-SUM tables with type, capacity, efficiency, test standard (or other efficiency source) for all mechanical equipment		
	C403.2.13	Electric motor efficiency	Provide equipment schedule with hp, rpm, efficiency for all motors; note except.		
	C403.2.10	Fan power limitation	Fan system motor hp or bhp does not exceed limits per Table C403.2.10.1(1)		
	C403.2.10.3 & C403.2.13	Fractional hp fan motors	Indicate fan motors 1/12 to 1 hp are ECM type or meet minimum efficiency req.		
	C403.2.3	Maximum air cooled chiller capacity	Indicate air-cooled chiller capacity does not exceed air-cooled chiller limit		
	C403.2.1	Non-standard water-cooled chillers	Full-load and NPLV values for water-cooled centrifugal chiller adjusted for non-standard operational conditions		
	C403.2.12.1.2	Centrifugal fan cooling towers	Large capacity cooling towers with centrifugal fan(s) meet efficiency requirements for axial fan open circuit cooling towers		
	C403.2.3	Forced air furnace and unit heaters	Indicate intermittent ignition or IID, flue/draft damper & jacket loss		
	C403.2.3.3	Packaged electric heating/cooling equipment	List equipment required to be heat pumps on schedule		
	C403.2.3.4	Humidification	Indicate method of humidification (note requirements for systems with economizer)		
HVAC System Controls & Criteria					
	C403.2.4.1	Thermostatic controls	Indicate locations of thermostatic control zones on plans, including perimeter systems		
	C403.2.4.1.1	Heat pump supplementary heat	Indicate staged heating (compression/supplemental) & outdoor lock-out temp		
	C403.2.4.2	Setpoint overlap (deadband)	Indicate 5°F deadband minimum for systems controlling both heating & cooling		
	C403.2.4.3	Automatic setback and shutdown	Indicate zone t-stat controls with required automatic setback & manual override		
	C403.2.4.3.3	Automatic (optimum) start	Indicate system controls that adjust equip start time to match load conditions		
	C402.4.5.2 & C403.2.4.4	Dampers	Indicate location of OSA, exhaust, relief and return air dampers; include AMCA rated leakage and control type (motorized or gravity; note exceptions		
	C403.2.11	Heating outside a building	Indicate radiant heat system and occupancy controls		
	C403.2.4.5	Snow melt systems	Indicate shut-off controls based on outdoor conditions		
	C403.2.4.6	Combustion heating equipment	Indicate modulating or staged control		
	C403.2.4.7	Group R1 hotel/motel systems	Indicate method for guest room automatic setback & set-up of 5°F minimum		
	C403.2.4.8 / 9	Group R2/R3 dwelling unit systems	Indicate 5-2 programmable thermostats in primary spaces with minimum of two setback periods; note exceptions taken		
	C403.2.5.1	Demand controlled ventilation	Indicate high-occupancy spaces and systems requiring DCV		
	C403.2.5.2	Occupancy sensors	Indicate spaces requiring occupancy-based system control and method; or alternate means provided to automatically reduce OSA when partially		
	C403.2.5.3	Enclosed loading dock/parking garage ventilation	Indicate enclosed loading dock and enclosed parking garage ventilation system activation and control method		
	C403.2.5.4.1	Kitchen exhaust hoods	Indicate kitchen hoods requiring make-up air; indicate make-up air source and conditioning method		
	C403.2.5.4.2	Laboratory exhaust systems	Indicate lab exhaust systems requiring heat recovery, method & efficiency; or alternative method taken (VAV, semi-conditioned makeup, or CERM calculation)		
	C403.2.6.1	Energy recovery - ventilation systems	Indicate ventilation systems requiring ER, method & efficiency; note exceptions		
	C403.2.6.2	Energy recovery - condensate systems	Indicate on-site steam heating systems requiring energy recovery		
	C403.2.6.3	Energy recovery - condenser systems	Indicate remote refrig. condensers requiring ER and use of captured energy		

Mechanical Permit Plans Checklist - Page 2 of 3 MECH-CHK

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Project Address					Date
The following information is necessary to check a mechanical permit application for commercial provision compliance with the 2012 WSEC. **NOTE: Define print area in Excel prior to printing MECH-CHK pages.**					
Applicability (yes,no,na)	Code Section	Code Provision	Information Required	Location on Plans	Building Department Notes
GENERAL PROVISIONS, CONTINUED					
HVAC System Controls & Criteria, Continued					
	C403.2.12	Variable flow control - fans/pumps	Indicate fan & pump motors requiring VF control & method (VSD or equiv controls)		
	C403.2.12.1	Variable flow control - cooling towers	Indicate cooling tower fans requiring variable flow control and method		
	C403.2.12.2	Large volume fan systems	Indicate fan systems requiring airflow reduction based on heating and cooling demand; or exception taken		
	C403.2.12.2	Single zone AC systems	Indicate method of cooling demand-based fan control for sys. > 110,000 btuh		
	C403.2.4.10	DDC system capabilities	Identify all DDC system input/output control points and indicate capability for trending and demand response setpoint adjustment		
Ducting Systems					
	C403.2.7.1 & C403.2.7.3	Duct construction	Indicate all ductwork constructed and sealed per IMC, C402 leakage requirements and IBC vapor retarder requirements		
	C403.2.7.3.1-3	Duct pressure classifications	Identify location of low, medium and high pressure ductwork on plans		
	C403.2.7.3.3	High pressure duct leakage test	Indicate high pressure duct leakage testing requirements on plans; provide test results to jurisdiction when completed		
	C403.2.7.1 / 2	Duct insulation	Indicate R-value of insulation on ductwork		
Piping Systems					
	C403.2.8	Piping insulation	Indicate R-value of insulation on piping		
	C403.2.8.1	Piping insulation exposed to weather	Indicate method of protection from damage/degredation		
SIMPLE SYSTEMS					
Qualifying Systems					
	C403.3	Qualifying single zone systems	Verify unitary or packaged equipment does not exceed capacity limits, does not have active humidifcation or simultaneous heating/cooling		
	C403.3	Qualifying 2-pipe heating systems	Verify 2-pipe heating-only system does not exceed capacity limits		
	C403.3.2	Hydronic system controls	Refer to Complex Systems Section C403.4.3		
Simple System Economizers					
	C403.3.1	Air economizer required	Indicate cooling systems requiring economizer controls; note in equip sched.		
	C403.3.1.1.1	Air economizer capacity	Indicate modulating OSA control capability up to 100% OSA, or exception		
	C403.3.1.1.3	Air economizer high limit controls	Indicate high limit shut-off control method per Table C403.3.1.1.3(2)		
	C403.1.1.2	Integrated air economizer operation	Indicate capability for partial air economizer operation for systems with capacity > 65,000 btuh		
	C403.3.1	Air economizer exceptions	Indicate eligible exception(s) taken and provisions to comply with exception(s)		
COMPLEX SYSTEMS					
Complex System Economizers					
	C403.4.1	Air economizer required	Indicate cooling systems requiring economizer controls; note in equip sched.		
	C403.4.1.4	Economizer heating system impact	Verify control method of HVAC systems with economizers does not increase building heating energy usage during normal operation		
	C403.4.1.3	Integrated economizer operation	Indicate capability for partial economizer operation for air or water econo systems		
	Moved	Water economizer capacity	Indicate water econo capable of 100% cooling capacity at 50°F db/45°F wb OSA		
	C403.4.1.2	Water economizer maximum pressure drop	Indicate precooling coils and heat exchangers do not exceed pressure drop limit		
	C403.3.1	Air economizer exceptions	Indicate eligible exception(s) taken and provisions to comply with exception(s)		

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Project Address	Date

The following information is necessary to check a mechanical permit application for commercial provision compliance with the 2012 WSEC. **NOTE: Define print area in Excel prior to printing MECH-CHK pages.**

Applicability (yes,no,na)	Code Section	Code Provision	Information Required	Location on Plans	Building Department Notes
COMPLEX SYSTEMS, CONTINUED					
Specific System Requirements					
	C403.4.2 & C403.2.12	Variable flow control - fans	Indicate fans requiring variable flow control and method		
	C403.4.2.1	VAV fan static pressure sensors	Indicate sensor locations on plans; include at least one sensor per major duct branch		
	C403.4.2.2	VAV fan static pressure setpoint	Indicate fan system static pressure setpoint based on zone requiring most pressure		
	C403.4.5	VAV systems serving multi-zones	Indicate supply air systems serving multiple zones that are required to be VAV, method of primary air control, and zones served; note exceptions taken		
	C403.4.5.4	VAV system supply air reset	Indicate controls that automatically reset supply air temp in response to loads		
	C403.4	Large capacity cooling systems	Indicate method of multi-stage or variable control for building cooling system capacity > 300 tons		
	C403.4.7	Hot gas bypass limitation	Indicate cooling equipment unloading or capacity modulation method		
	C403.4.3	Large capacity boiler systems	Indicate multi-stage or modulating burner for single boilers > 500,000 btuh		
	C403.4.3	Boiler sequencing	Indicate automatic controls that sequence operation of multiple boilers		
	C403.4.3.5	Chiller / boiler plant pump isolation	Indicate capability to automatically reduce overall plant flow and shut-off flow through chillers & boilers when not in use		
	C403.4.2 & C403.4.3.6	Variable flow control - pumps	Indicate pumps requiring variable flow control & method		
	C403.2.12.1 & C403.4.4	Variable flow control - cooling towers	Indicate cooling tower fans requiring variable flow control and method		
	C403.4.3.4	Hydronic system part load controls	Indicate heating & chilled water systems have the capability to automatically reset supply water temp AND reduce flow by ≥ 50% for systems > 300,000		
	C403.4.3.2	Two-pipe changeover systems	Indicate deadband, heating/cooling mode scheduling and changeover temperature range		
	C403.4.3.3.1	Water loop heat pump - deadband	Indicate capability of central equipment to provide min. 20°F water supply temp deadband between heat rejection and heat addition modes		
	C403.4.3.3	Water loop heat pump - heat rejection	Provide heat exchanger that separates cooling tower and heat pump loop in Climate Zone 5		
	C403.4.3.3.3	Water loop heat pump - isolation	Indicate 2-way isolation valve on each heat pump and variable flow control for systems with total pump power > 10 hp		
	C403.4.6	Condenser water heat recovery	Indicate system provided to pre-heat service water and efficiency		
	C403.5	Cooler / freezer - anti-sweat heaters	Indicate w/sf & control method for walk-in cooler/freezer door anti-sweat heaters		
	C403.5 / 6	Cooler / freezer - evaporator and condenser fans	Indicate motor type for evaporator and condenser fans < 1 hp		
SERVICE WATER HEATING					
Service Water Systems					
	C404.2	Water-heating equip min. efficiency	Provide equipment schedule or complete MECH-SUM table with type, capacity, efficiency, test standard (or other efficiency source)		
	C404.3	Temperature controls	Indicate temperature controls have required setpoint capability		
	C404.4	Heat traps	Indicate piping connected to equipment have heat traps on supply & discharge		
	C404.5	Insulation under water heater	Indicate R-10 insulation under tank		
	C404.6	Service water piping insulation	Indicate R-value of insulation on piping; note exceptions taken		
	C404.7 / 8	Circulation systems and heat trace shut-off	Indicate shut-off capability based on occupancy and periods of limited demand		
	C404.9	Group R-2 service hot water meters	Indicate method of usage metering for dwell. units served by central HW system		
Pools & In-Ground Permanently Installed Spas					
	C404.10.1	Pool heating equip min. efficiency	Provide equipment schedule or complete MECH-SUM table with type, capacity, efficiency, test standard (or other eff. source); heat pump heaters ≥ 4 COP		
	C404.10.1 / 2	Pool heater on / off controls	Indicate automatic on/off control based on scheduling & accessible on/off switch on heater that operates independent of thermostat setting; or		
	C404.10.3	Pool covers	Indicate vapor retardant cover and insulation rating as required		
	C404.10.3	Pool assembly insulation	Indicate rating of insulation on sides and bottom of pools heated to > 90°F		
	C404.10.4	Heat recovery	Indicate method, exhaust air temperature reduction and recovered energy use		